<u>REMARKS</u>

Claims remaining in the present patent application are numbered 1-30. The rejections and comments of the Examiner set forth in the Office Action dated July 10, 2003 have been carefully considered by the Applicants. Applicants respectfully request the Examiner to consider and allow the remaining claims.

<u>35 U.S.C. §102 Rejection</u>

The present Office Action rejected Claims 1-5, 8-13, 15-25, and 28-30 under 35 U.S.C. 102(b) as being anticipated by <u>Hamada et al.</u>, "A High-Speed Boundary Search SHMOO Plot for ULSI Memories" (IEEE Article, hereafter "Hamada"). Applicants have reviewed the above cited references and respectfully submit that the present invention as recited in Claims 1-30, is neither anticipated nor rendered obvious by the Hamada reference.

Independent Claims 1 and 21

Applicants respectfully point out that independent Claim 1 and 21 each recites that the present invention includes, in part:

> [A] method of testing operational boundaries
> comprising:
> discovering an operational range over a
> plurality of varying operating parameters for a
> device by testing points, as defined by said

plurality of varying operating parameters,
<u>beginning from a known interior operational point
as a single starting point when fully testing said
device</u>, to discover adjacently coupled boundary
points that define an operational boundary of said
device that comprises a plurality of boundary
points just outside of said operational range,
without testing all of a plurality of interior
operational points within said operational
boundary. (Emphasis Added)

Embodiments of the present invention pertain to a method
and apparatus for conducting a boundary search for shmoo
tests on an electronic device. In particular, independent
Claims 1 and 21 recite that the test discovers an operational
boundary of a device by testing the device beginning at a
known interior operational point.

Applicants respectfully note that the prior art
reference, Hamada, does not comprise nor suggest the present
method or computer system implementing the method, that
comprises, in particular, the test beginning from a known
interior operational point, a single starting point, when
fully testing the device to discover adjacently coupled
boundary points that define the operational boundary, as
claimed in independent Claims 1 and 21 of the present
invention.

In contrast to independent Claims 1 and 21 of the
present invention, the Hamada reference, discloses a method
for testing operational boundaries in a Shmoo plot. In

particular, the Hamada reference is distinct from the present invention, in that the Hamada reference does not begin from a known interior operational point to discover adjacently coupled boundary points that define the operational boundary.

Instead, the Hamada reference, as described in Figure 3 on page 5, begins by reducing the memory device address size of a device for testing to discover a rough estimate of the operational margin of the device under test (DUT). In this reduced address size, the reduced test pattern is subjected to a full Shmoo plot, as is shown in Figure 12(c). In Hamada, information for discovered boundary points is stored for every vertical axis value in the reduced test pattern. As stated in the Hamada reference, "[this] information is important to decide the test start point of the full address size pattern." (See Hamada, page 5, section 2-2) That is, the Hamada reference uses this operation, in part, to discover a boundary point, but more importantly a known failure point around the boundary point.

However, in direct contrast to embodiments of the present invention as claimed in independent Claims 1 and 21, once the rough estimate of the test boundary is established, the Hamada reference begins testing the DUT from a known failure point, and not from a known operational point. In particular, when testing the full address size of the DUT, the Hamada reference starts the testing of the Shmoo plot in

the fail region, as follows: "It is desirable to start in the fail region because the testing time becomes shorter than starting in the pass region." (See Hamada, page 5 section 2-2). That is, in the Hamada reference, the test start point when testing the full address size of the DUT is a fail point. This is in direct contrast to the present invention, which implements testing of the device beginning from a known interior operational point, as disclosed in independent Claims 1 and 21.

On the other hand, embodiments of the present invention, as claimed in independent Claims 1 and 21 disclose methods for testing operational boundaries that begin from a known interior operational point. As such, the present invention is distinct from the Hamada reference in that no rough estimate of the operational boundary is performed, and that when fully testing the device, that is not a rough estimate, the test begins at a known interior operational point, as a start point for the test, as claimed in independent Claims 1 and 21.

Thus, Applicants respectfully submit that the present invention as disclosed in independent Claim 1 is not anticipated by the Hamada reference, and is in a condition for allowance. In addition, Applicants respectfully submit that Claims 2-10 which depend from independent Claim 1 are also in a condition for allowance as being dependent on an

allowable base claim.   Similarly, Applicants respectfully

submit that the present invention as disclosed in independent

Claim 21 is not anticipated by the Hamada reference, and is

in a condition for allowance.   In addition, Applicants

respectfully submit that Claims 21-30 which depend from

independent Claim 21 are also in a condition for allowance as

being dependent on an allowable base claim.

Independent Claim 11

Applicants respectfully point out that independent Claim

11 recites that the present invention includes, in part:

> A method of testing operational boundaries
> comprising:
> . . .
> b) <u>beginning from a known operational point
> of said device as a starting point when fully
> testing said device, testing adjacently coupled
> points in a direction until an initial failure
> point is discovered</u>; and
> c) from said initial failure point, testing
> for and discovering each of a plurality of failure
> points that are adjacently coupled until returning
> to said initial failure point, said plurality of
> failure points defining an operational boundary for
> said device that bounds an operational range
> comprising a plurality of interior operational
> points within said operating region for said
> device. (Emphasis Added)

Embodiments of the present invention pertain to a method

and apparatus for conducting a boundary search for shmoo

tests on an electronic device.   In particular, independent

Claim 11 recites that the test discovers an operational

boundary of a device by testing the device beginning at a known interior operational point when fully testing the device.

For analogous arguments set forth for independent Claims 1 and 21, Applicants respectfully note that the prior art reference, Hamada, does not comprise nor suggest the present method or computer system implementing the method, that comprises, in particular, the test beginning from a known interior operational point as a starting point when fully testing the device, as recited in independent Claim 11 of the present invention. That is, the present invention is distinct from the Hamada reference in that no rough estimate of the operational boundary is performed, and that when fully testing the device, that is not a rough estimate, the test begins at a known interior operational point, as a starting point for the test, as claimed in independent Claim 11.

Moreover, the Hamada reference does not begin from a known operational point of the device when fully testing the device and test adjacently points in a direction until an initial failure point is discovered, as is recited in independent Claim 11 of the present invention. Instead, for analogous arguments set forth in independent Claims 1 and 21, the Hamada reference for each boundary point discovered typically begins at a failure point when fully testing the devic, and as such, cannot end at the fail point.

Furthermore, the Hamada reference, in Figure 9, does not disclose searching for an initial failure point when fully testing the device. Instead, the Hamada reference for every vertical axis value begins at a failure point as previously described to test in a horizontal direction around boundary points when testing the full address size of the device. This is in direct contrast to the present invention that begins at a known operational point when fully testing the device, and tests in a direction, any direction, to discover an initial failure point.

Thus, Applicants respectfully submit that the present invention as disclosed in independent Claim 11 is not anticipated by the Hamada reference, and is in a condition for allowance. In addition, Applicants respectfully submit that Claims 12-20 which depend from independent Claim 11 are also in a condition for allowance as being dependent on an allowable base claim.

35 U.S.C. §103 Rejection

The present Office Action rejected Claims 6, 7, 14, 26, and 27 under 35 U.S.C. 103(a) as being unpatentable over Hamada in view of Huston et al. (U.S. Patent No. 6,079,038). Applicants have reviewed the above cited references and respectfully submit that the present invention as recited in

Claims 1-30, is neither anticipated nor rendered obvious by the Hamada reference taken alone or in combination with the Huston et al. reference.

Applicants respectfully submit that the present invention as disclosed in dependent Claims 6, 7, 14, 26, and 27 are not anticipated or rendered obvious by the Hamada reference in view of the Huston et al. reference. Specifically, embodiments of the present invention as described in Claims 6, 7, 14, 26, and 27 for analogous arguments set forth above with respect to independent Claims 1, 11, and 21, each describe in part that when fully testing a device, that is not a rough estimate, the test begins at a known interior operational point, as a starting point for the test, as claimed in independent Claims 1 and 21, which is in direct contrast to the Hamada et al. reference taken alone or in combination with the Huston et al. reference. As such, dependent Claims 6, 7, 14, 26, and 27 are in a condition for allowance as being dependent on allowable base claims 1, 11, and 21, respectively.

CONCLUSION

In light of the facts and arguments presented herein, Applicants respectfully request reconsideration of the rejected Claims.

Based on the arguments presented above, Applicants respectfully assert that Claims 1-30 overcome the rejections of record. Therefore, Applicants respectfully solicit allowance of these Claims.

The Examiner is invited to contact Applicants' undersigned representative if the Examiner believes such action would expedite resolution of the present Application.

Respectfully submitted,

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